



UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR: Dillis V. Allen )  
INVENTION: AIRCRAFT INTEGRATED ) EXAMINER: Lulit Semunegus  
NON-LETHAL WEAPON )  
SYSTEM - AINLWS ) ART UNIT: 3641  
SERIAL NO: 09/955,898 )  
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U.S. Commissioner of Patents  
and Trademarks  
Washington, D.C. 20231

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*Response*  
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*Holmes*

AMENDMENT

Honorable Sir:

In response to the Office Action dated March 27, 2003, under this Amendment, applicant is re-presenting Claims 1 to 6 without amendment because the combination of prior art cited by the Examiner does not deal with the injection of non-lethal weapon material(NLW) into the cabin environment in an aircraft.

Thus, it is believed helpful at this point to review the objects of the present invention and applicant's solution.

An increase in bulkhead strength and security alone will not be completely effective because of the threat of bombs or the explosion of bombs in the cabin compartment and the injury or assassination of passengers and flight attendants in the cabin compartment which may prompt an egress

of cockpit personnel in an attempt to aid the problems in the cabin. This exposes the cockpit to take-over by the terrorists-hijackers.

It is apparent that non-lethal weapon systems provide the best solution to the aircraft hijacking problem.

There are many conditions under which deadly force is contraindicated by operational objectives. Unfortunately, since many low-intensity operations carry the threat of violence, the soldier, diplomat, or relief worker may still be in danger. The non-lethal weapon is an effective trade off between lethality and effectiveness. The ideal weapon must incapacitate the threat to the extent that it is not a threat anymore. This requires a careful balance between using too much force -- which would reassert the weapon as lethal -- or too little, thus only endangering the operator. To be an effective alternative to deadly force, the traditional mechanism for the soldier or marshal, the ideal non-lethal weapon must first meet the criteria of composition. Feasibility for use in the field depends on a weapon being portable and lightweight. In addition, the weapon must have the ability to be used over a considerable distance so that the soldier or marshal is not endangered by having to make a last-second decision regarding the level of

the threat. Although training is required to teach the circumstances for the use of any weapon, the person using a non-lethal weapon must be even more aware of the situation around him because employment of the weapon typically depends on the extent of the threat, as opposed to just the existence of the threat itself.

The next criteria to be examined for any non-lethal weapon is capability. The weapon must be able to stop a person effectively without causing death or permanent damage. Human beings vary in physical structure; therefore, it is possible for the same weapon to be effective on some and not on others. Even more worrisome is the fact that the amount of force might be too much, resulting in death or maiming. The possibility of abuse looms large when it is virtually impossible to measure in advance whether or not a given level of force will be effective. The flip side of this issue is also of great concern. The person armed with an ineffective non-lethal weapon is completely vulnerable in the face of a threat that has lethal force. In fact, the prevalence of lethal force today, incarnate primary as a conventional gun, is of grave concern. The mere fact that a

soldier will be carrying a non-lethal weapon in the face of a potentially lethal threat lends itself to the tendency to err towards more power than less.

The limitations stated above directly applies to the final attribute essential for creating a feasible non-lethal weapon. The power must be a variable. The operator must determine when to set a weapon on maximum level if put in the position of an attacking mob, or when to adjust it to a lower level to be used against children grabbing for his sidearm. The best power setting will neutralize the threat immediately, completely, and temporarily, with little or no side effects. "Set phasers to stun" may sound like science fiction, but the ability is essential if a non-lethal weapon is to be effective.

The first classification of non-lethal weapons is weapons that stun. These weapons are already through the developmental stage and are in use in municipal police forces as well as being stocked in military arsenals.

Stun grenades have been around for the past several decades. Often known as "flash bangs", they operate primarily by creating a blinding flash of light followed by a loud explosion. The concussion renders the threat stunned, at least temporarily. The weakness of this weapon

is that if it is used too close to the threat, it will kill them; and if used at too great a distance, it will be ineffective and only make the operator vulnerable to counter-attack. the ideal situation for the use of this weapon is crowd dispersal and riot control. Also, the flash-bang will often be more effective in less-developed countries, as they tend to be more vulnerable to unexpected and unnatural noises.

Plastic bullets have been used by the Israeli military with limited success. The goal of the rubber bullet is to inflict the right amount of pain to cause the threat to decrease charging, or to disperse a crowd. At close ranges, the muzzle velocity of the round is fatal; yet, without significant velocity the bullet is widely inaccurate and often drops to the ground. Because of this, there is a very narrow distance in which they are effective as a deterrent. Also, the rubber bullet can cause serious damage if it hits anywhere other than the chest. A shot to the face or the groin area can cause permanent damage or even death.

Another type of alternate projectile is the bean-bag bullet. Fired from a shotgun-like air-powered device, the bean-bag bullet is a fabric container filled with either

plastic or rubber shot. The effects and limitations are similar to those of the rubber bullet. Another variation of this type of projectile is the 40-mm non-lethal sponge grenade. Developed in direct response to an urgent request from U.S. Southern Command, the projectile has a plastic body equipped with a foam rubber nose. It is part of the ongoing Soldier Enhancement Program initiative begun in FY96. Fired from the M203 grenade launcher, the weapon allows the soldier to maintain a considerable standoff distance and still have knock-down power, but with limited lethality consequences.

The next area of research for weapons that stun is the chemical arena. The use of chemical weapons in military operations other than war is extremely limited because chemical weapons are strictly controlled by several international treaties. However, since the use of some chemical weapons is allowed to resolve internal problems, an overview of the options available is relevant because U.S. forces often work in conjunction with a foreign nation's military for various MOOTW.

CS gas, commonly referred to as tear gas, is used by police and riot control forces. The gas affects a person's external and internal membranes, proving to be a

considerable irritant to the eyes, throat, and lungs. While usually not fatal, nausea and faintness are potential side effects. The weakness of any chemical weapon is that adequate protection must be provided to the operator, lest they too fall victim to its effects.

A type of non-lethal chemical weapon currently in development is a kind of sleeping gas. A chemical spray that makes people fall asleep before noticing what's happening would be ideal in a terrorist-hostage situation.

A type of foam that immobilizes without being sticky is super foam. Dispensed from a portable generator type device with a 275 gallon tank, the foam covers an area about 200 feet long by 20 feet wide and 4 feet high. the foam is often laced with irritants and its primary purpose is to serve as a barrier. While it looks like soap suds, the consistency is denser and does not blow away in the wind. Used for crowd control or to block the entrance to an embassy or other building the foam is quite effective. Although portability of the generator is a question, this foam has excellent potential in limited applications.

Hostage rescue is a situation that also lends itself extremely well for the use of non-lethal weapons. Killing the terrorists is not necessarily a concern: killing

the hostages is. To circumvent this, measures such as a high-powered direct energy weapons would instantly kill them with no lateral damages. Mentioned before, a sleeping gas would be effective to overcome the terrorists before they realized what was happening to safely extract the hostages. Another weapon that would be of some use is CS gas. Designed to create a diversion long enough to get in better positions to kill the terrorists, the CS gas does not have any lasting effect on the hostages.

Realizing that the United States has involved itself in a great many situations that fall into MOOTW, the development and creation of the weapons examined is of vital military necessity.

In accordance with the present invention, an aircraft integrated non-lethal weapon system AINLWS is provided for commercial aircraft with a sealed bulkhead between the cockpit in the cabin. The cockpit has an air-conditioning system CAS separate from the cabin air-conditioning system PAS. A non-lethal weapon material is injected into the cabin by an NLW supply system, and the cabin is exhausted after hijacker securement, by an NLW exhaust system and returned to the normal cabin air system.



Non-lethal weapon NLW systems provide the best opportunity to minimize on-board hijacking because if designed properly, can disable the hijacker with reversible effects on the passengers, and after hijacker capture and securement, quickly return the cabin environment to normal, NLW free, minimizing any residual effects on the passengers.

The cabin passenger environment because completely enveloped, provides an ideal environment for the use of certain NLW materials because the cabin envelope confines those materials to the cabin as opposed to an outdoor or large building environment where the NLW materials would be directed to non-effective areas, thus requiring far greater quantities of the NLW materials. Furthermore, the quantification of the interior cabin volume by the NLW system designer, according to the present invention, would be a relatively easy calculation. Furthermore, this fixed volume environment for the NLW materials enables the quick and rapid exhaustion of the NLW materials after securement of the hijackers to minimize disabling effects on the passengers. Of course, the materials selected as NLW materials for the present system must create a balance between mini-

mizing passenger injury while providing sufficient effect to immobilize hijackers sufficiently to permit rapid and safe capture.

As discussed above, NLW systems include stun guns, chemical weapons, CS tear gas, sleeping gas, sticky foam, nets, super lubricants, super foam, radio frequency weapons, laser focusers, ultrasound emitters, microwave pulse generators, and many others.

The present invention defines non-lethal material NLWM as any substance presently, or in the future, used in NLW technology that when used in an aircraft having an unsealed bulkhead separating the cockpit from the cabin may when initiated in the cabin, penetrate the bulkhead and enter the cockpit. This definition would include gases, chemicals, sprays, foams, without any specific limitation to this list. It would exclude flame injectors, solid projectiles, and structural damaging explosives, as well as obviously any substance or object that would be lethal to the major portion of the passenger population in the aircraft.

The present AINLWS includes a separate cockpit air system CAS that operates in the S-mode to maintain cockpit environment during cabin assault.

When activated by an interior master control, the NLW material supply injects NLW material into the cabin disabling both passengers and terrorists-hijackers. After the hijackers have been disabled sufficiently, which could be viewed by a video camera from the cockpit area for example, the cabin is entered by cockpit marshals or other cockpit personnel and the terrorists-hijackers bound or otherwise confined. Thereafter, the master control is activated to initiate the NLW material exhaust system to exhaust the cabin of NLW material and return the cabin environment under the control of the normal cabin air system PAS.

In short, there is simply no suggestion in The Washington Post article, the Birch GB 2, 183,582, nor the Bruensicke, U.S. Patent No. 4,552,325, for a non-lethal weapon system for an aircraft, much less the specific one recited in the Claims which deals with the injection of NLW solely into the cabin sealed from the cockpit.

Claims 1-6 have been rejected under 35 USC 103(a) as being unpatentable over The Washington Post article, dated September 13, 2001, in view of the Bruensicke, U.S. Patent No. 4,552,325, in view of Birch, GB 2, 183,582, with the following statement:

"In regards to claim 1, The Washington Post teaches that Israeli national airline, El Al has been using the tactic of sealing off a cockpit door before the September 11, 2001 tragedy(page 2, paragraph 5 and 6), where the seal system is impervious to any material(page 2, 6th paragraph).

Birch teaches a non-lethal weapon system for an aircraft(page 2, lines 21-23).

As to claim 2, Bruensicke teaches a first air conditioning system for the cockpit and a second air conditioning system for the cabin (col. 3, lines 56-66).

As to claims 3 and 5, Bruensicke teaches an exhaust system for cabin material where the exhaust system can be used for any kind of emergency for removing unwanted cabin material(abstract).

As to claims 4 and 6, Bruensicke teaches an interior master control, IMC, for activating a supply system and for terminating the supply and activating the exhaust system (col. 2, lines 37-46).

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Bruensicke, Birch and Israeli's El Al tactic to protect the pilots from being affected by NLW and also it would have been obvious to add an exhaust system as taught by Bruensicke to any aircraft to clean up any material(smoke-non-lethal or lethal) from the cabin."

Even if the Examiner's combination of The Washington Post article, Birch, and Bruensicke was proper, the resulting system would not be a system that injects NLW into the cabin sealed from the cockpit area.

The Birch U.K. Patent Application GB 2 183 582 A, published June 10, 1987, does in fact relate to a non-lethal weapon system for aircraft, but the Examiner should note initially that there are no drawings in this application so it is difficult to determine how such a system is arranged and constructed. The more glaring deficiency, however, is that the Birch system can only be used on the ground because it disables the crew, as well as the passengers. Note on page 1, column 2, beginning at line 89: "The faculties of passengers and aircrew are likely also to be indiscriminately affected but since it is not likely that passengers and aircrew will need to take an intelligent action at this time, such temporary impairment, inconvenience and possible discomfort, may be regarded by those concerned as a small price to pay to avoid high risk of personal injury or loss of life whilst hi-jackers continue to be in control of the aircraft."

Note also in the first full paragraph in column 1 of page 2, it is stated: "Provision may be made for storing such substance or substances under secure conditions on board the aircraft so that the method of the present invention can be brought into use without necessity for security personnel to approach the aircraft."

Obviously, security personnel can only approach the aircraft when the aircraft is on the ground. Thus, the Birch system is totally inoperable as an in-air disablement system, and the Birch system has only a very limited use since most hijackings occur in the air and not on the ground.

The Washington Post article refers in a very general way to the Israeli El Al cockpits which have, for many years, been "sealed" off from the cabin area. This prior art is described in the second full paragraph of the Background of the Present Invention beginning on page 2. Thus, the reinforcement of the egress and ingress to the cockpit is not the present invention. The Washington Post article states: "El Al cockpits are sealed off by two virtually impenetrable doors, which are not opened during flight". This does not mean that they are sealed from NLW materials but merely they are sealed from mechanical penetration by a would-be hijacker or terrorist.

The Bruensicke system entitled "Emergency Smoke Disposal System for Pressurized Aircraft" deals solely with the evacuation of smoke from an aircraft fuselage, and it may be in the cabin area or the cockpit, caused by fire in the aircraft. There is not one word in the Bruensicke

patent about the injection of non-lethal weapon materials into the cabin or the evacuation of non-lethal weapons from the cabin, although it might be possible that this system could be used with a few non-lethal weapon materials.

So even if one combines Birch and Bruensicke with The Washington Post article, one simply has an aircraft with a mechanically reinforced cockpit door and a smoke evacuation system for the aircraft. The combination of Bruensicke and The Washington Post article results in nothing more, and applicant has no problem with that combination except that it simply does not anticipate any of the Claims in the present application.

Furthermore, while the Examiner does not describe exactly how Birch could be used to modify The Washington Post teachings or the Bruensicke teachings, applicant suggests that it is improper to combine these teachings to anticipate the present invention because the present invention is not anticipated for the reasons stated above by the combination of The Washington Post article and the Bruensicke teachings so that any modification of those basic teachings with Birch to anticipate the present invention would not be suggested to one with skill in the art mainly because Birch teaches a system that can only be used on the ground.

And that is why the Claims have not been amended and will probably not be amended unless the Examiner finds more relevant prior art.

Claim 1, for example, recites "a seal system for the bulkhead impervious to the selected NLW material in the cabin". While the El Al aircraft has reinforced cockpit doors, there is no suggestion in any article that applicant has read that they are impervious to any NLW materials. In other words, it could be, in the El Al system, even though the doors are strengthened, that the periphery of the bulkhead is not impervious to gas and foam materials, for example.

Next, Claim 1 recites "an NLW supply system for the cabin". It is quite clear that neither The Washington Post article nor the Bruensicke patent show any NLW supply system.

The Examiner suggests that with respect to Claim 2, "Bruensicke teaches a first air conditioning system for the cockpit, and a second air conditioning system for the cabin (col. 3, lines 56-66)." This is simply incorrect even though it does not correct the basic combination of The



Washington Post article and Bruensicke. Bruensicke simply does not teach separate air conditioning systems for the cockpit and cabin.

The Bruensicke patent states beginning at column 3, line 52:

"In addition to maintaining such a differential pressurization between the cabin and the external airstream, the aircraft's environmental control system is also required to control temperature within a normal comfort range and also to introduce fresh air into the cabin. These various functions are conventionally handled by redundant air conditioning packs, each driven by intermediate pressure (45 psig) (3.2 kg/cm<sup>2</sup>) engine bleed air. Each air conditioning pack thereby has the capability to provide an independent source of pressurized air at a predetermined temperature and flow rate. The conditioned air is mixed in an air distribution manifold and introduced into the various cabin zones through air outlet grilles in the cabin ceiling so as to produce a gentle circulation pattern within the cabin. Air is optionally also introduced through individual air outlets directed at particular seat positions."

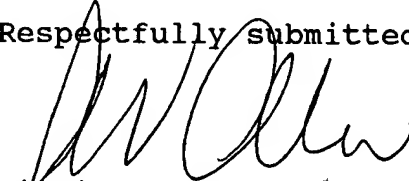
It is quite clear from this discussion that the Bruensicke air conditioning systems are redundant; that is, they are redundant in the sense that both provide air conditioning systems for the same space and not different spaces as suggested by the Examiner.

For the above reasons, Claims 1 to 6 are believed clearly patentable over the combination of The Washington Post article and the Bruensicke patent.

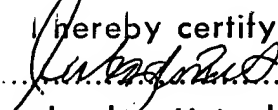
Applicant has reviewed the other patents cited by the Examiner; namely, the Walkinshaw, et al., U.S. Patent No. 6,491,254; the De Felipe, U.S. Patent No. 6,467,727, and the Mesr, EP 0 287 831 A1, but do not believe them more pertinent than the references discussed above.

In the absence of more pertinent prior art, and applicant believes the prior art cited is not at all relevant, it is respectfully requested that this application be allowed.

Respectfully submitted,

  
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I hereby certify that this correspondence,  is being deposited with the United States Postal Service as First Class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D. C. 20231, on July 24, 2003 1983

  
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Date